D-45: Geobarometry of garnet-pyroxene granulites from Southern Sri Lanka with special emphasis on the Highland-Vijayan boundary area

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Garnet- and pyroxene-bearing granulites are ubiquitous throughout the Highland Complex of Sri Lanka. Several geothermobarometric surveys have been conducted based on garnet + quartx = plagioclase-orthopyroxene equlibria and temperature dependence of cation exchange between garnet and pyroxenes. In spite of this, there is a less well-investigated area in southern Sri Lanka, west of the boundary between the Highland Complex (HC) and the Vijayan Complex (VC). A study covering the said area was undertaken to investigate the palaeo-pressure distribution towards the HC-VC boundary and to complement the existing thermobarometric data of southern Sri Lanka.

Twenty-five pyroxene granulite samples of intermediate to acidic composition were collected from the southern Sri Lanka encompassing areas of Matara, Hakmana, Mulatiyana,Weeraketiya, Panamure, Embilipitiya and Kataragama (an area of about 1500 Km^2). Core-rim compositions of garnet, plagioclase and orthopyroxene $\pm$ clinopyroxene was determined using a electron microprobe analyser. Bulk compositions of the rock samples were also determined by the XRF method. Temperatures were estimated according to the garnet-orthopyroxene thermometers and the garnet-clinopyroxene thermometer. Pressures were calculated assuming a reasonable average temperature of 750°C.

From mineral and bulk rock chemistry,it can be seen that there is a wide compostional range (i.e. mol. FeO/FeO + MgO ranges from 0.50 to 0.98) although most of the samples are relatively Mg-impoverished. Therefore formulations based on Fe-end member reactions are more suitable for the present study. It is obvious that lower pressures, around 6.5 kb, are from the western part (Matara-Mulatiyana) and highest pressures, around 9 kb, are from the east (HC-VC boundary area). Hence, there is a pressure increase of about 3 kb towards the east (HC-VC boundary). Although temperature estimates obtained from different thermometers scatter over a wide range, temperatures between 750-800 °C seem to be commonest and most reasonable.

The Precambrian crust now exposed in the eastern part of the studied area was buried to a depth of more than 35 km during granulite facies metamorphism. Comparable structural levels are indicated by the palaeo-pressure estimates from the Kataragama and Kuda Oya klippen. The western area represents relatively higher levels of the lower crust thus supporting the idea that the Sri Lanka Precambrian is a tilted ancient crustal block. The distortion of isobaric lines may be due to folding after peak metamorphism or due to the existence of thrust slices representing different crustal levels. In summary, the palaeo-pressure estimates and their regional distribution pattern obtained from the present study are consistent with the results of previous surveys carried out elsewhere in the HC.